

CLAIMS

What is claimed is:

1. A system for optimizing non-interactive three-dimensional image data comprising:
an optimizing encoder for generating three-dimensional rendering information optimized for real-time rendering of an image having an image quality within an error criteria of an image quality standard for a target computer system, and the optimizing encoder further having a model representing the target computer system for performing rendering of the rendering information, the target computer system represented being a type of computer system having a three-dimensional renderer.
2. The system of claim 1 wherein the optimizing encoder performs an optimization of the three-dimensional rendering information based upon criteria including a graphics processor capability of the target computer system.
3. The system of claim 2 wherein the optimizing encoder performs an optimization of the three-dimensional rendering information based upon criteria including characteristics of a physical infrastructure for transferring the optimized three-dimensional rendering information to the target computer system.
4. The system of claim 3 wherein the physical infrastructure is the Internet.
5. The system of claim 3 wherein the physical infrastructure is a digital versatile disc.
6. The system of claim 3 wherein the computer system is an interactive game console.
7. The system of claim 2 wherein the optimizing encoder performs an optimization of the three-dimensional rendering information based upon criteria including feedback information generated by the model during rendering of the three-dimensional rendering information.

1 8. The system of claim 7 wherein the feedback information includes a rendering time
2 measurement for a subset of a scene.

1 9. The system of claim 7 wherein the feedback information includes a rendering time
2 measurement for a scene.

1 10. The system of claim 7 wherein the optimizing encoder has a memory and the feedback
2 information includes rendered pixels generated by the model in rendering the optimized three-
3 dimensional rendering information.

1 11. The system of claim 7 wherein the feedback information includes command error
2 reporting.

1 12. The system of claim 7 wherein the optimizing encoder has a processor and a memory and
2 the model is a software emulation of the target computer system executing on the processor for
3 rendering three-dimensional rendering information.

1 13. The system of claim 7 wherein the model comprises a graphics processor for rendering
2 the optimized three-dimensional image data.

1 14. The system of claim 7 wherein the model is a graphics sub-system embodied in a
2 peripheral of the optimizing encoder.

1 15. The system of claim 1 wherein the optimizing encoder comprises:

2 an import unit for converting three-dimensional descriptions to an intermediate
3 format suitable for a plurality of target computer systems;

4 a multi-platform unit for generating a first optimized three-dimensional data set
5 by performing computations applicable to a plurality of target computer systems;

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6 a target-specific optimization unit for generating a second optimized three-
7 dimensional data set for a selected one of the target computer systems by performing at
8 least one optimization applicable to the selected target system; and
9 a bandwidth tuning unit for encoding the second optimized three-dimensional data
10 set in a three-dimensional protocol accounting for the characteristics of a physical infrastructure
11 from which the selected target computer system will access the second data set.

1 16. A method for optimizing non-interactive three-dimensional image data for rendering by a
2 target computer system comprising:

3 generating three-dimensional rendering information optimized for real-time rendering of
4 an image having an image quality within an error criteria of an image quality standard for the
5 target computer system, the target computer system represented being a type of computer system
6 having a three-dimensional renderer; and

7 encoding the optimized three-dimensional image data into a three-dimensional protocol.

1 17. The method of claim 16 wherein the three-dimensional protocol is a streaming protocol.

1 18. The method of claim 16 wherein generating three-dimensional rendering information
2 optimized for real-time rendering of an image having an image quality within an error criteria of
3 an image quality standard for the target computer system comprises:

4 performing an optimization based upon the graphics processor capability of the target
5 computer system.

1 19. The method of claim 16 wherein generating three-dimensional rendering information
2 optimized for real-time rendering of an image having an image quality within an error criteria of
3 an image quality standard for the target computer system comprises:

receiving feedback information from a rendering of the image by a model of the target system; and
selecting an optimization to be performed based on the feedback information.

20. The method of claim 16 wherein the encoding of the optimized three-dimensional image data into a three-dimensional protocol comprises:

encoding the rendering information to satisfy the bandwidth requirement of a physical infrastructure used for transferring the optimized information to the target computer system.

21. The method of claim 16 wherein generating three-dimensional rendering information optimized for real-time rendering of an image having an image quality within an error criteria of an image quality standard for the target computer system comprises the following:

converting three-dimensional descriptions to an intermediate format suitable for a plurality of target computer systems;

generating a first optimized three-dimensional data set by performing computations applicable to a plurality of target computer systems;

generating a second optimized three-dimensional data set for a selected one of the target computer systems by performing at least one optimization applicable to the selected target system; and

encoding the second optimized three-dimensional data set in a three-dimensional protocol accounting for the characteristics of a physical infrastructure from which the selected target computer system will access the second data set.

22. The method of claim 21 wherein the at least one optimization is an optimization based on microcode generation.

- 1 23. The method of claim 21 wherein the at least one optimization is an optimization
2 involving injecting corrective data
- 1 24. The method of claim 21 wherein the at least one optimization is an optimization based on
2 scheduling of object rendering and reordering of objects to be rendered.
- 1 25. The method of claim 21 wherein the at least one optimization is an image based
2 rendering technique.
- 1 26. The method of claim 21 wherein the at least one optimization is an optimization
2 involving deletion of unused data or delaying of rendering of data.
- 1 27. The method of claim 21 wherein the at least one optimization is an optimization
2 involving pre-computing runtime parameters.
- 1 28. The method of claim 21 wherein the at least one optimization is an optimization
2 involving optimizing assets.
- 1 29. The method of claim 21 wherein the at least one optimization is an optimization
2 involving texture creation.
- 1 30. The method of claim 21 wherein the at least one optimization is an optimization
2 involving shading computations.
- 1 31. The method of claim 21 wherein the at least one optimization is an optimization
2 involving manipulating geometry of objects within the image.
- 1 32. The method of claim 21 wherein the at least one optimization is an optimization
2 involving visibility determination of objects within the image.
- 1 33. The method of claim 21 wherein the at least one optimization is an optimization
2 involving compression.

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1 34. A system for optimizing non-interactive three-dimensional image data for rendering by a
2 target computer system comprising:

3 means for generating three-dimensional rendering information optimized for real-time
4 rendering of an image having an image quality within an error criteria of an image quality
5 standard for the target computer system, the target computer system represented being a type of
6 computer system having a three-dimensional renderer; and

7 means for encoding the optimized three-dimensional image data into a three-dimensional
8 protocol.

1 35. A computer usable medium comprising instructions that when executed by a processor
2 perform the following method for optimizing non-interactive three-dimensional image data for
3 rendering by a target computer system comprising:

4 generating three-dimensional rendering information optimized for real-time rendering of
5 an image having an image quality within an error criteria of an image quality standard for the
6 target computer system, the target computer system represented being a type of computer system
7 having a three-dimensional renderer; and

8 encoding the optimized three-dimensional image data into a three-dimensional protocol.